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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/689,100

10/21/2003

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117396

3816

25944 7590 08/13/2007
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EXAMINER

MILLER, MICHAEL G

ART UNIT

PAPER NUMBER

1709

MAIL DATE

DELIVERY MODE

08/13/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/689,100	SHIPTON ET AL.	
	Examiner	Art Unit	
	Michael G. Miller <i>MG M</i>	1709	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) 13-22 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>21 Oct 2003</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

- 1) Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - a) Claims 1-12, drawn to a method of forming a diffusion barrier on a substrate, classified in class 427, subclass 376.2.
 - b) Claims 13-22, drawn to a substrate with a diffusion barrier, classified in class 428, subclass 469.
- 2) The inventions are distinct, each from the other because of the following reasons:
- 3) Inventions a and b are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make another and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product of invention b can be formed by applying a diffusion barrier coating to a sacrificial substrate, curing the coating on said sacrificial substrate, and transferring the diffusion barrier coating from the sacrificial substrate to the product substrate.
- 4) Restriction for examination purposes as indicated is proper because all these inventions listed in this action are independent or distinct for the reasons given above and there would be a serious search and examination burden if restriction were not required because one or more of the following reasons apply:

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- i) the inventions have acquired a separate status in the art in view of their different classification;
- ii) the inventions have acquired a separate status in the art due to their recognized divergent subject matter;
- iii) the inventions require a different field of search (for example, searching different classes/subclasses or electronic resources, or employing different search queries);
- iv) the prior art applicable to one invention would not likely be applicable to another invention;
- v) the inventions are likely to raise different non-prior art issues under 35 U.S.C. 101 and/or 35 U.S.C. 112, first paragraph.

5) Applicant is advised that the reply to this requirement to be complete must include (i) an election of a invention to be examined even though the requirement may be traversed (37 CFR 1.143) and (ii) identification of the claims encompassing the elected invention.

6) The election of an invention may be made with or without traverse. To reserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the restriction requirement, the election shall be treated as an election without traverse. Traversal must be presented at the time of election in order to be considered timely. Failure to timely traverse the requirement will result in the loss of right to petition under 37 CFR

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- 1.144. If claims are added after the election, applicant must indicate which of these claims are readable on the elected invention.
- 7) If claims are added after the election, applicant must indicate which of these claims are readable upon the elected invention.
- 8) Should applicant traverse on the ground that the inventions are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the inventions to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.
- 9) During a telephone conversation with Aaron Webb on 16 July 2007, a provisional election was made with traverse to prosecute the invention of Group a, claims 1-12. Affirmation of this election must be made by applicant in replying to this Office action. Claims 13-22 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.
- 10) Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Rejections - 35 USC § 103

11) The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12) Claims 1-9 and 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Klotz (U.S. Patent 3,395,027, hereinafter '027) in view of Mosser et al (U.S. Patent 5,803,990, hereinafter '990).

13) With regard to Claim 1, '027 teaches a method of coating a substrate, the method comprising:

- a) Applying to the substrate a coating comprising a source of a ceramic-forming metal oxide (Column 2 Lines 22-34) and a source of a phosphate binder for the metal oxide (Column 2 Lines 40-62), and
- b) Causing the metal oxide and the phosphate to cure to form a diffusion barrier comprising a phosphate bonded ceramic on the titanium alloy substrate (Column 3 Line 49 – Column 5 Line 11).
- c) '027 does not explicitly teach a titanium alloy substrate, though it does teach that ferrous base metals in corrosive environments are suitable substrates for coating (Column 1 Lines 19-29).
- d) '990 teaches that titanium alloys are ferrous compounds (Column 11 Lines 22-25).

- e) Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified the coating method as taught in '027 to coat a titanium alloy substrate as taught in '990 because '027 teaches a method of coating suitable for ferrous base metals in corrosive environments and '990 teaches that titanium alloy is a ferrous compound.

14) With specific regard to Claim 2, which includes all the limitations of Claim 1 above, '027 teaches a method according to Claim 1, wherein:

- a) The coating is applied in one step (Column 3 Lines 49-53).

15) With specific regard to Claim 3, which includes all the limitations of Claim 1 above, '027 teaches a method according to Claim 1, wherein:

- a) The coating is applied as an acidic aqueous medium comprising the oxide source and the phosphate source (Column 2 Lines 5-9).

16) With specific regard to Claim 4, which includes all the limitations of Claim 1 above, '027 teaches a method according to Claim 1, wherein:

- a) The oxide source is selected from oxides and hydroxides of magnesium, aluminium, iron, chromium, sodium, zirconium and calcium, and any mixture or chemical or physical combination thereof (Column 3 Lines 14-46, all examples teach magnesium and chromium oxides or combinations thereof).

17) With specific regard to Claim 5, which includes all the limitations of Claim 1 above, '027 teaches a method according to Claim 1, wherein:

- a) The phosphate source is selected from phosphoric acid and phosphates of potassium, aluminium, ammonium, beryllium, calcium, iron, lanthanum, lithium, magnesium, magnesium-sodium, magnesium-potassium, sodium, yttrium, zinc, zirconium, and any mixture or chemical or physical combination thereof (Column 3 Lines 14-46, all examples teach phosphoric acid or magnesium dihydrogen phosphates).

18) With specific regard to Claim 6, which includes all the limitations of Claim 4 above, '027 teaches a method according to Claim 4, wherein:

- a) The oxide source is selected from magnesium oxide, chromium oxide and mixtures thereof (Column 3 Lines 14-46).

19) With specific regard to Claim 7, which includes all the limitations of Claim 3 above, '027 teaches a method according to Claim 3, wherein:

- a) The acidic aqueous medium further comprises one or more optional additional ingredients (Column 3 Lines 14-46, all examples contain nitric acid and aluminum particles).

20) With specific regard to Claim 8, which includes all the limitations of Claim 7 above, '027 teaches a method according to Claim 7, wherein:

- a) The one or more optional additional ingredient is selected from one or more of rheology modifiers, buffers, pH reducers, oxidising agents, reducing agents, other cure retardants and surfactants (Column 3 Lines 14-46, wherein nitric acid is a pH reducer and aluminum powder is a rheology modifier which will thicken the solution by its presence).

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21)With specific regard to Claim 9, which includes all the limitations of Claim 3 above,

'027 teaches a method according to Claim 3, wherein:

- a) The acidic aqueous medium consists essentially of the oxide source, the phosphate source, water, and optionally one or more of rheology modifiers, buffers, pH reducers, oxidising agents, reducing agents, other cure retardants or surfactants, with less than about 10% by weight of other ingredients (Column 3 Lines 14-46, by above interpretations there is 0% by weight of other ingredients as the nitric acid and aluminum particles are a pH reducer and rheology modifier respectively).

22)With specific regard to Claim 11, which includes all the limitations of Claim 1 above,

'027 teaches a method according to Claim 1, wherein:

- a) The coating is applied in a thickness of up to about 25 μm (Column 4 Lines 12-16; .0005in = 12.7 μm).

23)With specific regard to Claim 12, which includes all the limitations of Claim 1 above,

'027 teaches a method according to Claim 1, wherein:

- a) Curing of the coating is initiated by heating the coating (Column 3 Line 49 – Column 5 Line 11)

24)Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over '027 in view of '990 and further in view of Trocynski et al (U.S. PGPub 2002/0107133, hereinafter '133) and Wydra et al (U.S. Patent 3,857,717, hereinafter '717).

25)With specific regard to Claim 10, which includes all the limitations of Claim 1 above,

'027 teaches a method according to Claim 1, wherein:

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- a) The coating is applied as substantially the following composition (Column 3 Lines 32-39, Example 3):
 - i) Water
 - ii) Phosphoric acid
 - iii) Chromium trioxide
 - iv) Magnesium oxide
 - v) Spherical aluminum particles
 - vi) Nitric acid
- b) Neither '027 nor '990 teach chromium oxide, clay or magnesium hydrogen phosphate explicitly. In addition, '027 teaches nitric acid which is not called for by Applicant.
- c) Justification For Removing Nitric Acid
 - i) In the related process of '990 (Column 7 Line 15 – Column 11 Line 14), boric acid is used as an additive.
 - ii) '990 requires the borate ions as provided by the aforementioned boric acid as a manner of pH adjustment (Column 5 Lines 23-25).
 - iii) Both '027 and '990 speak of adding the borate/nitrate ion to the coating solution, preferentially as an acid but acceptably as a metal salt ('027 – Column 3 Lines 63-68; '990 – Column 5 Lines 16-20). '990 also says that the pH may be lowered by adding sources of the phosphate ion including phosphoric acid and metal acid salts (Column 3 Lines 64-67). This leads to the conclusion that borate, nitrate and phosphate ions are all pH adjusters.

iv) '027/'990 discloses the immediately relevant portion of the claimed invention except that '027/'990 has a mixture of pH adjusting ions instead of a single source (phosphates). '027/'990 shows that phosphate ions and nitrate ions are equivalent structures known for this purpose in the art. Therefore, because these two ions were art-recognized equivalents at the time the invention was made, one of ordinary skill in the art would have found it obvious to substitute phosphate ions for nitrate ions and thereby to add phosphate ion-producing chemicals in place of nitric acid.

d) Justification For Including Magnesium Hydrogen Phosphate

i) '027 teaches the use of metal phosphates as a means to introduce metal and phosphate ions to the solution (Column 2 Lines 54-60). Magnesium hydrogen phosphate meets this definition as a monobasic phosphate of magnesium (one OH⁻ group).

ii) H₃PO₄ and MgHPO₄ serve the equivalent function of providing PO₄³⁻ ions into solution. Therefore, it would have been obvious to add MgHPO₄ to the mixture of '027/'990; "It is *prima facie* obvious to combine two compositions each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition to be used for the very same purpose....

[T]he idea of combining them flows logically from their having been individually taught in the prior art." *In re Kerkhoven*, 626 F.2d 846, 850, 205 USPQ 1069, 1072 (CCPA 1980).

e) Justification For Including Chromium(III) Oxide

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- i) '133 teaches methods of providing a phosphate-bonded ceramic coating using Cr_2O_3 as the oxide source (Paragraphs 0039-0040).
 - ii) CrO_3 and Cr_2O_3 serve the equivalent function of providing Cr ions into solution. A mixture of these compounds in solution is obvious for the same reasons as in the previous section.
- f) Justification For Including Clay
- i) '027 teaches adding aluminum powder to protect against corrosion (Column 2 Lines 12-16).
 - ii) '717 teaches adding kaolin powder, a clay mineral also known as kaolinite, to a phosphate-bonded chromium ceramic coating for its chemical resistance, i.e. resistance to corrosion (Column 2 Lines 27-52). Kaolinite's chemical structure is $\text{Al}_2\text{Si}_2\text{O}_5(\text{OH})_4$.
 - iii) Aluminum powder and kaolinite are both shown to be suitable for providing corrosion resistance. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to use kaolinite in place of aluminum powder because the selection of something based on its known suitability for its intended use has been held to support a *prima facie* case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, U.S. 327, 65 USPQ 297 (1945).
- g) Concentrations
- i) The combination of '027/'990/'133/'717, as rendered obvious above, shows the claimed mixture but is silent as to the concentrations.

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- ii) Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. "[W]here the general conditions of a claim are disclosed in the prior art; it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

Conclusion


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael G. Miller whose telephone number is (571) 270-1861. The examiner can normally be reached on MTWR 7:30 - 5:00, F 7:30 - 4:00, Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on (571) 272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MGM *MGM*


JENNA BEFUMO
PRIMARY EXAMINER